CLAIMS

1. An optical system (10) comprising:
   - an optical fiber path (12) suitable for propagating an optical signal at least in a first direction;
   - a plurality M of optical line amplifiers ($13^1 \ldots 13^6$), disposed along said optical fiber path (12), so as to divide said optical fiber path in N spans of optical fiber ($14^1 \ldots 14^5$), said spans of optical fiber comprising at least one transmission optical fiber having an effective length L_{eff}, and
   - an optical phase conjugation device (15) associated to an amplifier of said plurality of amplifiers,

   characterized in that it further comprises
   - an optical fiber length (16) disposed upstream from said optical phase conjugation device (15) and a further optical amplifier (19) associated to said optical fiber length (16), said optical fiber length (16) having the same sign of dispersion of said transmission optical fiber and a higher dispersion coefficient, in absolute value, at a wavelength of said optical signal, said optical fiber length (16) being adapted for introducing an accumulated dispersion comprised between 0.6 and 1.5 times a dispersion accumulated in an effective length L_{eff} of said transmission optical fiber.

2. An optical system according to claim 1, characterized in that said optical fiber length (16) has an absolute value of dispersion coefficient higher than or equal to two times the dispersion coefficient of said transmission optical fiber.

3. An optical system according to claim 2, characterized in that said optical fiber length (16) has an absolute value of dispersion coefficient higher than or equal to three times the dispersion coefficient of said transmission optical fiber.

4. An optical system according to any one of the previous claims, characterized in that said optical line amplifiers ($13^1 \ldots 13^6$) comprise erbium-doped fiber amplifiers.

5. An optical system according to any one of the previous claims, characterized in that said further optical amplifier (19) provides an output power higher than an average output power of said plurality of line amplifiers (13^1...13^6).

6. An optical system according to any one of the previous claims, characterized in that said optical fiber length (16) has a nonlinear coefficient higher than a nonlinear coefficient of said transmission optical fiber.

7. An optical system according to any one of the previous claims, characterized in that said optical fiber length (16) is adapted for introducing an accumulated dispersion higher than or equal to 0.8 times the dispersion accumulated in an effective length L_{eff} of said transmission optical fiber.

8. An optical system according to any one of the previous claims, characterized in that said optical fiber length (16) is adapted for introducing an accumulated dispersion lower than or equal to 1.2 times the dispersion accumulated in an effective length L_{eff} of said transmission optical fiber.

9. An optical system according to any one of the previous claims, characterized in that said transmission optical fiber has a dispersion higher than or equal to 0.5 ps/nm/km, in absolute value, at the signal wavelength.

10. An optical system according to any one of the previous claims comprising a transmitting station (11a), a receiving station (11b), said transmitting station (11a) being connected at an input end and said receiving station (11b) being connected to an output end of said optical fiber path (12).

11. A method for assembling an optical system (10) suitable for propagating an optical signal, comprising the steps of:

- providing a plurality M of optical line amplifiers (13^1....13^6);
- connecting said plurality of optical line amplifiers (13^1....13^6) by N spans of optical fiber (14^1....14^5) so as to form an optical fiber path (12), said spans of optical fiber (14^1....14^5) comprising at least one transmission optical fiber having an effective length L_{eff},

- associating a phase conjugation device (15) to one of said optical line amplifiers;

characterized in that it further comprises the steps of

- connecting an optical fiber length (16) upstream from said optical phase conjugation device (15), said optical fiber length having the same sign of dispersion of said transmission optical fiber and a higher dispersion coefficient, in absolute value, at a wavelength of said optical signal, said optical fiber length being adapted for introducing an accumulated dispersion comprised between 0.6 and 1.5 times a dispersion accumulated in an effective length L_{eff} of said transmission optical fiber, and
- associating a further optical amplifier (19) to said optical fiber length (16).

12. A method of operating an optical transmission system (10) comprising an optical fiber path (12) including at least one transmission optical fiber having an effective length L_{eff} and a plurality of optical line amplifiers (13^1....13^6) disposed along said optical fiber path (12), said method comprising:
    - inserting an optical signal at an input end of said optical fiber path (12);
    - amplifying said optical signal along said fiber path by said plurality of optical line amplifiers (13^1....13^6);
    - phase-conjugating said optical signal at one of said line amplifiers (13^1....13^6);

    characterized in that it further comprises the steps of:
    - before said step of phase-conjugating, inserting said optical signal at an input end (17) of an optical fiber length (16) having the same sign of dispersion of said transmission optical fiber and a higher dispersion coefficient, in absolute value, at a wavelength of said optical signal, said optical fiber length (16) being adapted for introducing an accumulated dispersion comprised between 0.6 and 1.5 times a dispersion accumulated in an effective length L_{eff} of said transmission optical fiber, and
    - amplifying said optical signal in association with said optical fiber length (16).

13. A method of upgrading an optical transmission system comprising an optical fiber path (12), the optical fiber path including at least one transmission optical

fiber having an effective length L_{eff} and a plurality of optical line amplifiers (13^1....13^6) disposed along said optical fiber path (12), said method comprising:

- associating a phase conjugation device (15) to one of said plurality of optical amplifiers (13^1....13^6);
- connecting an optical fiber length (16) upstream from said phase conjugation device (15), said optical fiber length (16) having the same sign of dispersion of said transmission optical fiber and a higher dispersion coefficient, in absolute value, at a wavelength of said optical signal, said optical fiber length (16) being adapted for introducing an accumulated dispersion comprised between 0.6 and 1.5 times a dispersion accumulated in an effective length L_{eff} of said transmission optical fiber;
- associating a further optical amplifier (19) to said optical fiber length (16).